Cytology of Ascomycetes.—Miss FRASER and Miss WELSFORD have recently added another contribution[13] to their important series on the cytology of the Ascomycetes. The present investigation deals with two additional Discomycetes—*Otidea aurantia* and *Peziza vesiculosa*. The authors have studied principally the triple reducing divisions in the ascus, and their observations accord in the main with those of HARPER on Phyllactinia. They find in these two species, however, intermediate conditions between the early pairing of the chromosomes in Phyllactinia and their complete independence during the stages preceding reduction in Humaria, as described in an earlier paper by Dr. FRASER. In Otidea, for example, the chromosomes do not pair till the prophases of the third (or brachymeiotic) division; whereas in *Peziza vesiculosa* they unite during the prophases of the second division in the ascus. This variation in the time of chromosome union, as described for these species, is compared in tabular form with the conditions which obtain in Humaria, Galactinia, and Phyllactinia.

The authors describe two phases of the reduction processes—the meiotic phase, embracing the first and second divisions in the ascus, distinguished in Otidea by four chromosomes and in *Peziza vesiculosa* by eight chromosomes; and brachymeiosis, involving the second reduction, when the two sets of post-meiotic chromosomes become separated during the third division, thus resulting in two chromosomes in Otidea, and four in Peziza. A definite synaptic contraction occurs in connection with meiosis, similar to that first described by HARPER in Phyllactinia; but, unlike the case in Phyllactinia and in Humaria, a second contraction takes place in the two forms studied at the beginning of brachymeiosis. The authors regard the presence of both meiosis and brachymeiosis as evidence of the occurrence of two fusions in the life-history of these forms; although in neither form were the first, "presumably pseudapagamous," fusions found. Further confirmation of HARPER'S account of spore-formation is presented in that the authors find the spores delimited by the astral radiations. But they incline to the view that the rays represent, not active contractile fibers, but rather the paths of activity of an enzyme which is generated at the centrosome and which flows out equally all around the center, delimiting the spore by the chemical changes thus produced.—E. W. OLIVE.

Mitosis in Funkia.—An account of nuclear division in Funkia is given by Miss SYKES in two short papers,[14] one dealing with the reduction division in the pollen mother cell, and the other with the somatic division as it occurs in the archesporial cells and in the ovary wall.

The results may be summarized as follows: (1) The nuclear reticulum in

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[13] FRASER, H. C. I. AND WELSFORD, E. J., Further contributions to the cytology of the Ascomycetes. Annals of Botany **22**:465–477. *pls. 26, 27.* 1908.

[14] SYKES, M. G., Nuclear division in Funkia. Archiv für Zellforschung **1**:380–398. *pls. 8, 9. fig. 1.* 1908.

———, Note on the number of the somatic chromosomes. *Idem* **1**:525–527. *pl. 16.* 1908.

the resting stages of the mother cell is composed of a number of knots connected by filaments. The pairing of the reticulum appears at a very early stage. The number of pairs of knots, though it is impossible to make an accurate count, far exceeds the number of pairs of chromosomes. She concludes that in Funkia it is inadvisable to call the knots prochromosomes. (2) Occasional contact between the pairs of knots is observed in synapsis, but they do not constitute clear cases of fusion. (3) The double thread is formed from the reticulum during synapsis due to the paired arrangement of the constituents of the nucleus. (4) The double thread fuses into a single spirem, but at the time of segmentation into chromosomes it splits along the line of fusion (thus an element of each bivalent chromosome is not one-half resulting from the division of a single spirem, but an entire piece of the double thread which fused to form a single spirem). (5) Heterotypic division of chromosomes takes place along this fission, so that there is a true reduction division. (6) In each of the daughter chromosomes a new second split occurs longitudinally. (7) The reticulum and knots in the nucleus of the pollen grain are unpaired throughout, but a double structure is found in the prophase of the somatic nucleus. (8) The number of chromosomes in the somatic nucleus of *Funkia ovata* and *F. sieboldiana* seems to vary from 36 to 48, probably is 48, the reduced number being near 24.—S. YAMANOUCHI.

Fossil Osmundaceae.—KIDSTON and GWYNNE-VAUGHAN have recently published a second contribution[15] on the extinct Osmundaceae, which deals anatomically with two species of a new genus (*Zalesskya*) from the Permian of the Ural. *Z. gracilis* and *Z. diploxylon* are characterized by a central cylinder, which the authors infer to be protostelic from the manner of exit of the leaf traces. Unfortunately in one species the center of the fibrovascular tissues of the stem has disappeared through maceration, correlated with fossilization, and in the other by the crumbling away of the stony matrix. The authors admit that the general anatomy of the fossils is not distinctively osmundaceous. They place great diagnostic importance in this connection, however, on the minute structure of the xylem tracheids, which are characterized by multiseriate pits and vessel-like perforations of the pit membranes of the terminal walls. The authors seem to attach a somewhat exaggerated importance to these features, however, since both have long been known to occur in ferns not related to the Osmundaceae. They infer that their fossils make it "clear *that the central ground tissue of the recent Osmundaceae must be regarded as phylogenetically derived by modification from the central xylem of a solid* (sic) *protostele and that primitively it had no relation with the cortex whatever.*" This statement appears to have scarcely a better basis in logic or fact than their contention in the first article that foliar gaps are primitively absent in the Osmundaceae. Even if it be admitted that the authors' species are osmundaceous, which is very far from being certain, the conclusion reached appears hardly in accordance with sound reasoning. The

[15] KIDSTON, R., AND GWYNNE-VAUGHAN, D. T., On the fossil Osmundaceae. II. Trans. Roy. Soc. Edinburgh **46**[2]:213–232. *pls. 1–4.* 1908.